IN THE SPECIFICATION:

Page 3, lines 6-14, please enter the following replacement paragraph.

The operations and functions of the respective parts of the magnetic disk apparatus will be described with reference to a block diagram of Fig. 6 (with reference to Fig. 2). Upon data writing, the interface circuit 19 (same function in both Figs. 2 and 6) receives digital data from the outside, then the data is amplified to a write current via a data encoder 62 (similar to data encoder 26 in Fig. 2) and a write amplifier 15 (same function in both Figs. 2 and 6) as signal processing circuits, and the write current is inputted into the write element 53 of the head 30 and converted into a write magnetic field.

Page 3, line 15 through page 4, line 7, please enter the following replacement paragraph.

Upon data reading, the read element 54 of the head 30 converts a leak magnetic field generated from the disk 31 into an electric signal. The electric signal is amplified by a read amplifier 14 (same function in both Figs. 2 and 6), inputted into a data decoder 20 (same function in both Figs. 2 and 6) as a signal processing circuit and demodulated to the initial digital data. The digital data is sent by the interface circuit 19 to an external host machine. The head 30 can freely move in the disk radial direction by the rotary actuator 13 (same function in both Figs. 2 and 6). To write and read a particular data track, a following operation must be accurately performed in a target radial position. The servo circuit 16, which controls the following operation, measures accurate relative positions of the head 30 and the disk

31 from servo information previously written on the disk 31, and controls the operation of the rotary actuator 13 via an amplifier 17 to move the rotary actuator. The hard disk controller (HDC) 65 generally controls these processings.

Page 16, line 21 through page 17, line 14, please insert the following replacement paragraph.

Figs. 8A and 8B show the structure of the magnetic head according to another embodiment of the present invention. Fig. 8A shows a cross-section of a head 80 viewed from a side position, and Fig. 8B, the head 80 viewed from the disk 12 side (disk 12 not shown in Figs. 8A, 8B, see, *e.g.*, Fig. 2). Even when the head 80 is slanted to the direction of movement of the disk 12, a write element offsetting mechanism ~~of offsetting write element~~ 83 according to the second embodiment can offset a write element 85 in the slider width direction indicated with an arrow in the figure, accordingly, the center line of a heat element 82 and that of the write element 85 can be accurately brought into correspondence. In this embodiment, the storage capacity of the thermal assisted type magnetic disk apparatus can be greatly increased by similar advantages to those of the first embodiment. Note that in the present embodiment, a read element 84 is also integrally offset with the write element 85, however, the present invention is not limited to this arrangement but it may be arranged such that only the write element 85 is offset.

Page 17, line 15 through page 18, line 15, please insert the following replacement paragraph.

Fig. 2 is a block diagram showing the functional construction of the magnetic disk apparatus according to the present invention. The apparatus has a second servo circuit 23 to control the heat element offsetting mechanism 5 (too small to be shown in FIG. 2, see, *e.g.*, FIGs. 1A, 1B) or the write element offsetting mechanism 83 (to small to be shown in FIG. 2, see, *e.g.*, FIGs. 8A, 8B) and amplifiers 25 and 22, and a reference table ~~72~~ 24, in addition to the conventional first servo circuit 16 and the amplifier 17 to control a rotary actuator. The second servo circuit 23 reads a value from a reference table 24 in correspondence with a numerical value of a target track (related to a yaw angle) received from the HDC 21 and an environmental temperature, and calculates an output value. The output value from the second servo circuit 23 is inputted into the offsetting mechanism 5 or mechanism 83 on the head 1 via an amplifier to offset the heat element or the write element 22, and the arrangement of the heat element 4 and the write element 3 on a straight line in the direction of disk movement is kept at an arbitrary yaw angle. (Since elements 4 and 3 are carried on the head 1, they are too small to be shown in Fig. 2, see, *e.g.*, Figs. 1A, 1B.) At this time, the HDC 21 also controls the heat element 4 using the heat amplifier 25. Note that in this control, as the operation of the offsetting mechanism 5 or 83 is completed in correspondence with a seek speed of the second servo circuit 23, the response is comparatively slow. Accordingly, the control can be performed, in combination with an adjusting process to be described later, in an open loop.

Page 18, line 16 through page 20, line 1, please enter the following replacement paragraph.

Fig. 9 shows an example where the heat element offsetting mechanism 5 is realized with piezo elements. Fig. 9 is a cross-section of a surface of a head 91 opposite to the disk 12 (not shown in Fig. 9, see, *e.g.*, Fig. 2), in which an arrow indicates a right-to-leftward direction of movement of the disk 12. A pair of piezo elements 93 and 94 are arrayed in parallel to each other. The piezo elements 93 and 94 generate mutually opposite lateral forces based on a voltage output from the amplifier 22 (not shown in Fig. 9, see, *e.g.*, Fig. 2) to offset the heat element or the write element ~~22~~. A head 91 is provided with a hinge function comprised of an elastic body to increase its moving direction by converting the forces into up-to-down directional forces. By this arrangement, the heat element 92 moves in the slider width direction. In the present embodiment, a downsized, light weighted and highly-rigid offsetting mechanism can be realized. Further, a positional shift hardly occurs upon reception of impactive force from the outside, and high reliability to malfunctions can be attained. Further, as the amount of electric consumption of the piezo element is small and the amount of heat generation thereof is small, the influence of drift due to self heat generation is small. Further, as the linearity between an input value into the piezo element and the offset position is high, the heat element can be accurately moved to a target offset position. Thus the storage capacity of the thermal assisted type magnetic disk apparatus can be greatly increased. In the present embodiment, the pair of two piezo elements are employed, however, the present invention is not limited to this arrangement. In a case where one of these piezo element is used, similar advantages can be obtained though the linearity is slightly degraded. Further, in the present embodiment, the heat element

92 is offset, however, the present invention is not limited to this arrangement, but similar advantages can be obtained in a case where the write element 96 is offset.

Page 20, line 2 through page 21, line 6, please enter the following replacement paragraph.

Figs. 10A and 10B show an example where the heat element offsetting mechanism 5 is realized with a capacitance actuator 102, to offset heat element 103. Fig. 10A is a partially expanded cross-sectional view of a head 101 viewed from a side position, in which the direction of movement of the disk 12 is backward direction vertical to the surface of the drawing sheet. Fig. 10B is a partially expanded cross-sectional view of a surface of the head 101 opposite to the disk 12, in which an arrow indicates a up-to-downward direction of movement of the disk 12. The capacitance actuator 102 is provided in parallel to the disk 12. A voltage output from an amplifier to offset heat element or write element is applied to a capacitance electrode 104, thereby left-to-right directional forces are generated so as to freely offset a heat element 103. As the capacitance actuator can be formed by a wafer process, a downsized and light weighted offsetting mechanism, particularly having good compatibility with a process of planer type head, can be realized. Further, as the amount of electric consumption of the capacitance actuator is small and the amount of heat generation there of is small, the influence of drift due to self heat generation is small, and positioning between a heat element 103 and a write element 105 can be accurately made. Thus the storage capacity of the thermal assisted type magnetic disk apparatus can be greatly increased. In the present embodiment, the heat element 103 is offset, however, the present invention is not limited to this

arrangement. In a case where the write element 105 is offset, similar advantages can be obtained.

Page 23, line 9 through page 24, line 22, please enter the following replacement paragraph.

Fig. 12 shows an example where the heat element offsetting mechanism 5 of the present invention is realized with a light source, a mirror and an object lens. Fig. 12 is a cross-sectional view of a head 1202 viewed from a side position, in which an arrow indicates a right-to-leftward direction of movement of the disk 12. The offset direction is a backward direction vertical to the surface of the drawing sheet. An object lens 1206 is provided on a surface opposite to the disk 12, and a heating light element 1204 and a mirror 1205 are mounted on a rear surface opposite to the above surface opposite to the disk 12. The heating light element 1204 and the mirror 1205 are attached to a mechanism of offset 1203, and the positions of the heating light element 1204 and the mirror 1205 can be offset in a track width direction while approximately parallel positional relation is maintained. In this arrangement, a light axis reflected by the mirror 1205 and incident on the object lens 1206 is moved in approximately parallel. The light axis can be prevented from slanting, and a very small area on the disk can be heated. Further, as the heating light element 1204 is positioned away from a read element 1208 and a write element 1207, degradation of performance of the read element and the write element, due to heat generation by the heating light source, can be prevented. In the present embodiment, the storage capacity of the thermal assisted type magnetic disk apparatus can be greatly increased, and a magnetic disk with a high reliability can be

provided. Further, the object lens can also be provided with the offsetting mechanism so as to heat a smaller area on the disk. In this arrangement, as the light axis reflected by the mirror 1205 and incident on the magnetic disk is moved in approximately parallel, a focusing shift due to slanted light axis or slanted light incidence can be prevented. A solid immersion lens can be applied to the object lens, and a further smaller area on the disk can be heated. In the present embodiment, the storage capacity of the thermal assisted type magnetic disk apparatus can be further greatly increased.

Page 25, line 9 through page 26, line 25, please enter the following replacement paragraph.

Next, a method for electrically connecting the respective elements and the offsetting mechanism mounted on the head of the present invention will be described with reference to Fig. 13. Terminal electrodes for the write element, the read element, the heat element and the offsetting mechanism are provided on a side surface of a head 1304 <u>mounted on arm 1302 utilizing mount hole 1301</u>. Note that the terminal electrode for the heat element and the offsetting mechanism may be provided on a head rear surface opposite to the surface opposite to the disk in accordance with arrangement of the heat means and the offsetting mechanism. The terminal electrodes are respectively bonded on a wiring <u>1305</u> on a suspension <u>1303</u>. The electrodes, laminated with insulating material, and are extended from an arm <u>1302</u> to connector pads <u>1306</u>. The connector pad wired from the heat element is supplied with heating energy connected to an output from a heat amplifier 1309. Further, the connector pad wired from the offsetting mechanism is supplied with

energy to drive the offsetting mechanism connected to an output from an amplifier of offsetting mechanism 1310. The read element is connected to an input of a read amplifier 1308, and the write element is connected to an output of a write amplifier 1307, and the read element and the write element perform reading operation and writing operation. As described above, on the suspension of the head of the present invention, only 4 pairs of electric wirings (1311, 1312, 1313 and 1314) are formed, and in comparison with the techniques of transmitting energy using an optical fiber and a comparatively large mirror, a head appropriate for a downsized, light weighted and high-speed transfer magnetic disk apparatus can be provided. Further, as the offsetting mechanism can be electrically controlled, the positioning between the heat element and the write element can be accurately made, and the storage capacity of the thermal assisted type magnetic disk apparatus can be greatly increased. Note that the above-described offsetting mechanism using a pair of piezo elements and the capacitance actuator may use 3 or 4 electrodes for improvement in linear accuracy. In this case, the total number of electric wirings is 9 or 10.